



4164-01-P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

[Docket No. FDA-2018-N-1558]

Food and Drug Administration's Evaluation of Approaches to Demonstrate Effectiveness of Heartworm Preventatives for Dogs; Request for Comments

AGENCY: Food and Drug Administration, HHS.

ACTION: Notice; request for comments.

SUMMARY: The Food and Drug Administration (FDA or we) is evaluating its current thinking regarding the design of studies intended to generate data to support substantial evidence of effectiveness for investigational new animal drugs intended for the prevention of heartworm disease in dogs. We are specifically requesting public input on possible alternative approaches for evaluating such products or information to assist in the potential development of alternative recommended study designs.

DATES: Submit either electronic or written comments on the proposed method by [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: You may submit comments as follows. Please note that late, untimely filed comments will not be considered. Electronic comments must be submitted on or before [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. The <https://www.regulations.gov> electronic filing system will accept comments until midnight Eastern Time at the end of [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. Comments received by mail/hand

delivery/courier (for written/paper submissions) will be considered timely if they are postmarked or the delivery service acceptance receipt is on or before that date.

### *Electronic Submissions*

Submit electronic comments in the following way:

- Federal eRulemaking Portal: <https://www.regulations.gov>. Follow the instructions for submitting comments. Comments submitted electronically, including attachments, to <https://www.regulations.gov> will be posted to the docket unchanged. Because your comment will be made public, you are solely responsible for ensuring that your comment does not include any confidential information that you or a third party may not wish to be posted, such as medical information, your or anyone else's Social Security number, or confidential business information, such as a manufacturing process. Please note that if you include your name, contact information, or other information that identifies you in the body of your comments, that information will be posted on <https://www.regulations.gov>.
- If you want to submit a comment with confidential information that you do not wish to be made available to the public, submit the comment as a written/paper submission and in the manner detailed (see "Written/Paper Submissions" and "Instructions").

### *Written/Paper Submissions*

Submit written/paper submissions as follows:

- Mail/Hand delivery/Courier (for written/paper submissions): Dockets Management Staff (HFA-305), Food and Drug Administration, 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852.

- For written/paper comments submitted to the Dockets Management Staff, FDA will post your comment, as well as any attachments, except for information submitted, marked and identified, as confidential, if submitted as detailed in “Instructions.”

*Instructions:* All submissions received must include the Docket No. FDA-2018-N-1558 for “FDA’s Evaluation of Approaches to Demonstrate Effectiveness of Heartworm Preventatives for Dogs.” Received comments, those filed in a timely manner (see ADDRESSES), will be placed in the docket and, except for those submitted as “Confidential Submissions,” publicly viewable at <https://www.regulations.gov> or at the Dockets Management Staff between 9 a.m. and 4 p.m., Monday through Friday.

- Confidential Submissions--To submit a comment with confidential information that you do not wish to be made publicly available, submit your comments only as a written/paper submission. You should submit two copies total. One copy will include the information you claim to be confidential with a heading or cover note that states “THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION.” The Agency will review this copy, including the claimed confidential information, in its consideration of comments. The second copy, which will have the claimed confidential information redacted/blacked out, will be available for public viewing and posted on <https://www.regulations.gov>. Submit both copies to the Dockets Management Staff. If you do not wish your name and contact information to be made publicly available, you can provide this information on the cover sheet and not in the body of your comments and you must identify this information as “confidential.” Any information marked as “confidential” will not be disclosed except in accordance with 21 CFR 10.20 and other applicable disclosure law. For more information about

FDA's posting of comments to public dockets, see 80 FR 56469, September 18, 2015, or access the information at:

<https://www.fda.gov/regulatoryinformation/dockets/default.htm>.

*Docket:* For access to the docket to read background documents or the electronic and written/paper comments received, go to <https://www.regulations.gov> and insert the docket number, found in brackets in the heading of this document, into the "Search" box and follow the prompts and/or go to the Dockets Management Staff, 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852.

Submit written requests for single copies of the proposed method to the Policy and Regulations Staff (HFV-6), Center for Veterinary Medicine, Food and Drug Administration, 7500 Standish Pl., Rockville, MD 20855. Send one self-addressed adhesive label to assist that office in processing your requests. Persons with access to the internet may obtain the draft guidance at either

<https://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM052417.pdf> or <https://www.regulations.gov>.

FOR FURTHER INFORMATION CONTACT: Steven Fleischer, Center for Veterinary Medicine (HFV-110), Food and Drug Administration, 7500 Standish Pl., Rockville, MD 20855, 240-402-0809, [steven.fleischer@fda.hhs.gov](mailto:steven.fleischer@fda.hhs.gov).

SUPPLEMENTARY INFORMATION: FDA is evaluating its current thinking regarding the design of studies intended to generate data to support substantial evidence of effectiveness for investigational new animal drugs intended for the prevention of heartworm disease in dogs.

An application for a new animal drug shall include "evidence to establish safety and effectiveness" (21 CFR 514.1(b)(8)). Additionally, "an application may be refused unless it

includes substantial evidence of the effectiveness of the new animal drug as defined in 514.4 [21 CFR 514.4]” (21 CFR 514.1(b)(8)(ii)). Regarding studies, under 21 CFR 514.4(b)(3)(i) substantial evidence of the effectiveness of a new animal drug for each intended use and associated conditions of use shall consist of a sufficient number of current adequate and well-controlled studies of sufficient quality and persuasiveness to permit qualified experts:

- To determine that the parameters selected for measurement and the measured responses reliably reflect the effectiveness of the new animal drug;
- To determine that the results obtained are likely to be repeatable, and that valid inferences can be drawn to the target animal population [(independent substantiation and inferential value)]; and
- To conclude that the new animal drug is effective for the intended use at the dose or dose range and associated conditions of use prescribed, recommended, or suggested in the proposed labeling.

The current recommended approach to demonstrating substantial evidence of effectiveness of an investigational new animal drug intended for the prevention of heartworm disease is for sponsors to conduct two laboratory dose confirmation studies and one multi-site field safety and effectiveness study under the principles of Good Clinical Practice (GCP) as described in Guidance for Industry #85, “Good Clinical Practice (VICH GL9).”<sup>1</sup> The laboratory dose confirmation studies are experimentally-induced infection studies, each conducted at different laboratory facilities, led by independent investigators and using recent isolates of *Dirofilaria immitis* from two separate United States geographic locations. The field

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<https://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM052417.pdf>.

effectiveness study is a multi-site study conducted with investigators in various geographical regions of the continental United States with endemic heartworm disease that evaluates the use of the investigational new animal drug in client-owned animals.

Both study types have strengths and limitations. Strengths of the laboratory studies includes the use of a negative control group, which provides direct evidence of the effect of the new animal drug and that results are not due to the impact of other treatments or external influences on disease transmission and progression. In addition, laboratory studies allow for appropriate classification of exposure due to contemporaneous experimental infection of the same number of infectious *D. immitis* larvae to control and investigational new animal drug-administered groups and the appropriate classification of outcome due to performance of an adult worm count post mortem. The worm count allows for qualitative and quantitative evaluation of outcome by determining the presence of adult worms as well as the determination of the individual worm burden in each dog. One significant limitation of the laboratory studies is the evaluation of only two isolates. Although each isolate should be from a different geographic area in the United States, under laboratory conditions the isolates may not accurately represent the current diversity of *D. immitis* in the United States and may not account for variable susceptibility in the isolates in the field. From a substantial evidence of effectiveness standpoint, this condition limits the inferential value of the two studies because the use of the laboratory isolates may over- or under-represent the relative susceptibility of other isolates in the field to the investigational new animal drug. Additionally, the small number of animals used in the study limits confidence in the interpretation of effectiveness results.

The strength of the field study is that the study evaluates the investigational new animal drug under actual conditions of use and with the current enzootic status and genetic factors

affecting the disease in each location, thereby providing better inferential value than the laboratory study. Limitations of the field study are that the exposure to infective *D. immitis* larvae is assumed, but uncertain, and, in cases of dogs with positive antigen tests, the actual timing of the exposure is unknown. Additionally, the relatively short duration of the field study in relationship to the heartworm life cycle and testing limitations may not adequately evaluate the entire dosing period of the investigational new animal drug. Assurance that individual dogs were exposed to *D. immitis* larvae during the critical first few months of the study is lacking, which complicates interpretation of a negative antigen test at the end of the study. If the study is started during a time of low transmission, such as in winter, exposure is even more uncertain. Because of the delay in the ability to detect an adult heartworm infection, it is impossible to tell with certainty if infections detected between 4 and 8 months after study initiation were pre-existing infections or due to lack of effectiveness of the preventative. Obtaining false negative and false positive antigen test results are possible and, because worm counts are not performed, the false results may result in the misclassification of outcome for individual dogs.

In recognition of the limitations of the current recommended laboratory and field effectiveness studies for heartworm preventatives for use in dogs, we are interested in evaluating alternative approaches to these study designs that would mitigate the limitations of such studies while ensuring that the studies generate data to support substantial evidence of effectiveness as defined in 21 CFR 514.4.

Currently, there are gaps in knowledge and understanding that prevent us from fully evaluating alternative approaches to meeting the substantial evidence of effectiveness standard. To address these gaps, we are seeking public comment regarding the following questions:

*Population level effectiveness endpoint.* The design and evaluation of effectiveness studies rely on an understanding of the appropriate outcome measure. In seeking to design alternative study approaches, we would like to determine a population level effectiveness endpoint that could be used to design future studies. Currently we do not have a defined level of performance that heartworm preventatives are expected to meet when applied to the entire United States canine population. Determining a population level endpoint would allow us to explore the suitability and feasibility of alternative study designs for the evaluation of effectiveness for heartworm preventatives. Factors that may contribute to a heartworm preventative's effectiveness include the inherent potency of the drug, differences in heartworm susceptibility, and owner compliance.

1. Assuming that a product was administered according to labeled directions, what would be an acceptable rate of failure of an approved heartworm preventative in the overall United States canine population to which it is administered?

2. What would be the maximum acceptable rate of failure in a high-risk population?

3. Alternatively, if you do not have a numerical estimate, what recommendations do you have for determining what an acceptable rate of failure should be?

*Exposure to infective D. immitis larvae.* For humane reasons, field studies are not conducted with a negative control group that would reflect the study population's level of exposure to heartworm infection. Therefore, it is necessary to have other measures to ensure that the level of exposure to infective *D. immitis* larvae experienced in the study is sufficient to adequately test the effectiveness of the investigational new animal drug. Please provide comment on other methods that could reliably be used to ensure adequate exposure of dogs enrolled in a field study. Consider the following points:



4. Can available tests be used to determine an individual dog's exposure to infective larvae? What are the sensitivity and specificity of those tests in this application? How would the level of sensitivity and specificity of these tests impact the reliable assessment of rate of failure in the population?

5. Does the use of a heartworm preventative, even if only partially effective, have an impact on the results of these tests?

6. Could methods that consider a wider area (as opposed to an individual animal) such as mosquito testing, forecasting, or modeling be reliably used to determine the likely exposure to infective larvae of dogs at a specific study site? What information would be needed to create the methods or to verify the validity of the methods? What are the limitations to such an approach?

*Outcome Assessment.* Accurate assessment of the outcome endpoint (heartworm infection) is essential for field studies where necropsy worm counts will not be performed.

7. What are the most reliable ways of properly classifying the outcome in a non-terminal study?

8. Are there critical pieces of information supporting substantial evidence of effectiveness that can only be gained from a well-controlled laboratory study? Are there elements that could be added to a field study that would partially address those data gaps?

*Other.*

9. Are there laboratory study designs other than the traditional dose confirmation study that provide additional information or include a model that is more representative of real world exposure? For example, the use of live mosquitoes to induce infection rather than the mechanical injection of larvae.

10. How might differences in the route of administration, dosing frequency, or pharmacokinetic factors impact effectiveness? How might studies be designed to incorporate these factors? For example, a drug that demonstrates an early peak, with minimal to no drug levels in the dog for the remainder of the dosing interval versus a product with continuous drug levels in the dog for the entire dosing interval?

Dated: May 21, 2018.

Leslie Kux,

Associate Commissioner for Policy.

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